ANALYSIS OF THE QUALITY OF DELIVERY AND STUDENTS' ENGAGEMENT IN UNIVERSITI SAINS MALAYSIA-DEVELOPED VIDEO LECTURES

by

FATEMEH HABIBIAN NAEINI

Thesis submitted in fulfilment of the requirements
for the Degree of
Doctor of Philosophy

July 2018

DEDICATION

This thesis is dedicated to my lovely husband, Dr. Omidreza Tarighati Anaraki, who has been a constant source of hope, support, and encouragement during the challenges of this research.

This work is also dedicated to the great souls of my late parents, Mohammad Habibian Naeini, and Zahra Moeini Naeini, who have always loved me unconditionally, provided me a happy and comfortable life, and given me love, self-confidence, and diligence.

This thesis is also dedicated to my lovely and good-hearted brothers and sisters, and their lovely families, all of whom have always given me love, support, and encouragement in my life and my education.

ACKNOWLEDGEMENT

I would like to express my full gratitude and heartfelt appreciation to all individuals who have contributed to the completion of this thesis.

Foremost, I would like to thank my first supervisor Prof. Merza Abbas. It has been an honour to be his student, and I appreciate all his contributions of time and ideas to make my PhD experience inspiring and productive. My deepest thanks go to him as a spiritual father, for his great personality, continuous encouragement, support, tutelage, and his perseverance in guiding me.

In addition, I have to express my appreciation and gratefulness to my present main supervisor, Prof. Irfan Naufal Umar, firstly, for his great, respectable, and patient character, and secondly, for his supervision, advice, guidance, encouragement, support, and his invaluable assistance during this study. He taught me how to work harder, and without his help, I would not have been able to complete my studies.

I would also like to express my special thanks to the Director of the Centre for Instructional Technology and Multimedia, Assoc. Prof. Dr. Wan Ahmad Jaafar, and all faculty members and administrative staff of the Centre, who have always provided facilities and supported genuinely and whole-heartedly.

My special gratitude goes to all the lecturers of the Centre for Instructional Technology and Multimedia: Prof. Wan Mohd Fauzy Wan Ismail, Prof. Balakrishnan Muniandy, Prof. Irfan Naufal Umar, Dr. Hosam Faiq Al-Samarraie, Assoc. Prof. Mona Masood, Assoc. Prof. Zarina Samsudin, Assoc. Prof Rozinah Jamaluddin, and the late Mr. Rossafri Mohamad, who have taught me and tolerated me in my Master's programme. Their patience, kindness, and humility, as well as their invaluable academic teaching is highly appreciated and will not be forgotten.

I also would like to thank to Dr. Mariam Mohamad, and also Dr. Siti Nazleen Abdul Rabu, who have always encouraged me and made me feel positive.

My gratefulness also goes to the Director of the Centre for Development of Academic Excellence (CDAE) at Universiti Sains Malaysia, Prof. Abd Karim Alias, who provided all the facilities in the data collection process of this work, and generously supported me to complete this stage of the thesis.

Also, I would like to express my full and sincere appreciation to my late parents who provided me a happy and comfortable life, and resided me love and self-confidence. I also want to thank my lovely brothers and sisters and their families for all their love and encouragement. And most of all, my loving, supporting, and encouraging husband whose faithful constant support during my PhD journey is so much appreciated, and words are inadequate to express my gratitude for his sacrifice, support, and patience.

Last but not least, I would like to thank all friends, classmates, and all individuals without whom the completion of this thesis would have not been possible. My thanks go to them for their contribution that they have provided me, whether directly or indirectly, which led this work to be accomplished.

Fatemeh Habibian Naeini

Universiti Sains Malaysia

July 2018

TABLE OF CONTENTS

CHAPTER TWO - REVIEW OF LITERATURE

CHAPTER THREE - RESEARCH METHODOLOGY

CHAPTER FOUR - DATA ANALYSIS

LIST OF FIGURES

Page

LIST OF TABLES

Page

ANALISIS KUALITI PENYAMPAIAN DAN PENGLIBATAN PELAJAR DALAM VIDEO-KULIAH UNIVERSITI SAINS MALAYSIA

ABSTRAK

Dalam usaha untuk mentransformasikan pengajaran dan pembelajaran di peringkat universiti, Universiti Sains Malaysia (USM) telah memperkenalkan inisiatif merakam kuliah-kuliah tertentu dalam bentuk video dan meletakkannya dalam portal sistem pengurusan pembelajarannya (LMS). Pengukuran kualiti penyampaian dalam video-kuliah tersebut dibuat dengan menggunapakai Model Pengajaran Langsung, di mana pensyarah bertindak sebagai pakar isi kandungan yang akan melibatkan pelajar masing-masing, dan dalam pada masa yang sama, mengurus sesi pengajaran-pembelajaran mereka. Kualiti pengajaran para pensyarah tersebut dinilai oleh para pelajar mereka pada setiap penghujung semester, namun tidak terdapat sebarang bentuk penilaian sama ada kuliah-kuliah tersebut adalah mengikut format Pengajaran Langsung. Di samping itu, terdapat keperluan untuk menyiasat sama ada video-video kuliah tersebut berjaya mencetus penglibatan aktif pelajar untuk membolehkan pembelajaran berlaku, dan sama ada elemen-elemen penglibatan mereka (Pengimbasan, Penyelesaian Masalah, Pengabstrakan, Penerapan, Penyerapan, serta Pengesanan) terkesan dari kualiti penyampaian pensyarah (Pengenalan, Pembangunan Idea, Latihan Terbimbing, serta Penutup). Oleh yang demikian, kajian ini bertujuan menyiasat kaedah penyampaian yang terdapat dalam video-video kuliah yang dibangunkan USM, meneroka tanggapan pelajar mengenai kualiti penyampaian, kesan *snowball*, serta penglibatan mereka dalam menggunakan video-video tersebut. Di samping itu, berdasarkan video-video kuliah tersebut, kajian ini turut berhasrat untuk menyiasat perhubungan antara elemen-elemen Pengajaran Langsung dengan

penglibatan pelajar serta kesan *snowball* pelajar. Kajian ini menggunapakai pendekatan penyelidikan campuran di mana ia melibatkan penggunaan soal selidik serta temubual susulan bersama kumpulan pelajar sasaran. Populasi kajian ini adalah para pelajar ijazah pertama yang mendaftar sembilan kursus di mana rakaman video kuliah-kuliah tersebut telah dimuatnaik ke LMS berkaitan. Seramai 153 orang pelajar telah terlibat sebagai sampel kajian ini, dan mereka memberikan maklumbalas terhadap dua soal selidik berkaitan, dan 10 orang peserta kajian ini turut dilibatkan dalam sesi temubual susulan. Bagi tujuan analisis data kuantitatif, borang penilaian dalam bentuk rubrik, statistik deskriptif dan regresi linear pelbagai telah digunakan. Sementara itu, pengkodan, perbandingan serta interpretasi hasil temubual dilakukan bagi komponen kualitatif bagi tujuan triangulasi data. Keputusan menunjukkan bahawa persepsi pelajar berkenaan kualiti penyampaian dalam video-video kuliah yang dibangunkan USM serta persepsi penglibatan mereka terhadap video-video tersebut adalah pada tahap persetujuan yang tinggi. Seterusnya, keputusan analisis regresi menunjukkan kesemua elemen kualiti penyampaian (Pengenalan, Perkembangan Idea, Latihan Terbimbing, serta Penutup) mempunyai kesan signifikan terhadap penglibatan pelajar serta terhadap kesan *snowball* mereka. Keputusan yang sama diperolehi daripada temubual yang dijalankan. Seterusnya, dua model telah diperolehi berdasarkan analisis regresi yang dijalankan, yang menunjukkan kesan signifikan elemen-elemen kualiti penyampaian video kuliah USM terhadap penglibatan pelajar, serta terhadap kesan *snowball*.

ANALYSIS OF THE QUALITY OF DELIVERY AND STUDENTS' ENGAGEMENT IN UNIVERSITI SAINS MALAYSIA-DEVELOPED VIDEO LECTURES

ABSTRACT

In an effort to transform teaching and learning in the university, Universiti Sains Malaysia (USM) has embarked on providing recorded video lectures on its own official Learning Management System. The measure of the Quality of Delivery of video lectures is captured by the Direct Instruction model of teaching, where the instructor acts as a content expert who directly engages the learners and at the same time manages their learning. The lecturers are evaluated by their students at the end of the semester, but there is no evaluation as to whether their lectures have followed the Direct Instruction format. Furthermore, there is a need to investigate whether the video lectures trigger active engagement necessary for learning to occur, and whether the elements of the Students' Engagement (Scanning, Problem Solving, Abstraction, Diffusion, Absorption, and Impacting) are affected by the elements of the Quality of Delivery (Introduction, Idea Development, Guided Practice, and Closure). Thus, the objectives of this study are to analyse the method of delivery of USM-developed video lectures, to explore the users' perceived Quality of Delivery, perceived Snowball Effect, and perceived Engagement in using the USM-developed video lectures. The current study also attempts to investigate the relationships between the Direct Instruction elements with the students' engagement, and the snowball effect of users, through using the USM-developed video lectures. A mixed method research approach was carried out for this study, involving two survey questionnaires and follow-up interview with the targeted learners. The population encompassed undergraduate

students of Universiti Sains Malaysia, who registered in nine courses, in which the lecturers were recorded and uploaded their video lectures in the Learning Management System environment. The two sets of questionnaires were administered to 153 students, and the follow-up interview was carried out to ten students from the same groups. In order to analyse the data for quantitative strand of this study, an evaluation rubric form, a descriptive statistics method, and a multiple linear regression method of statistics were employed. For the purpose of triangulating the data, the process of coding, analysing, and interpretation of the recorded interviewee have been done. The results from the analysis show that the users' perceived Quality of Delivery of USM-developed video lectures, as well as their perceived Engagement into those videos, were at a high level of agreement. Moreover, the results of the regressions demonstrate that all elements of the Quality of Delivery (Introduction, Idea Development, Guided Practice, and Closure) had significant effects on the students' engagement and also on the Snowball Effects. The same results were observed from the recorded interviewee of the current study. Consequently, two models were developed from the conducted regressions, which elaborate the significant effects of the elements of the Quality of Delivery of USM-developed video lectures on the students' engagement, and also on their learning Snowball Effect.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The Direct Instruction method of delivery is probably the most popular teaching strategy that is used by teachers to facilitate learning. Because, this method is a teacher-directed method that follows a definite structure with specific steps to guide learners toward achieving clearly defined learning outcomes. The term "Direct Instruction" refers to a rigorously developed, highly scripted method for teaching that is fast-paced and provides constant interaction between students and the teacher. Dixon (2016) in his revised edition of Engelmann and Carnine's theory of instruction (1991), particularised this theory on three cognitive elements, namely, a) *faultless communication*, which consists of logically clear presentations that result in single and specific interpretation without any confusion, misinterpretation and misunderstanding, b) *an assumption of learning mechanisms*, which encompasses learning from examples, non-examples, and qualities of sameness and similarities, and c) *an assumption of the ability to generalize from a given structure*, set of characteristics, and range of concepts, and also through practice. Moreover, Dixon (2016) believes that, through using the Direct Instruction method, the teacher maintains the locus of control over the instructional process and monitors students learning throughout the process. The benefits of Direct Instruction include delivering a large amount of information in a timely manner. Also, because this model is teacher directed, it lends itself to design instruction that is developmentally appropriate and accurate to learners' ages and stages.

The Direct Instruction model of delivery that is distracted from comprehensive processes set up, was entitled by other names, such as systematic teaching, or explicit teaching, or active teaching, but the final term which is currently used is known as Direct Instruction which was first introduced by Siegfried Engelmann and his cohort (Tarve, 2013).

In the Direct Instruction approach of teaching which is considered as a skill-driven and teacher-directed approach, cognitive skills are being taught unambiguously, and they are being sequenced and broken down into smaller units by the instructor purposely, with the intention of reassurance from delivering an articulated, detailed, and comprehensive lesson (Tarve, 2013).

Moreover, the Direct Instruction method and its benefits has been applied in higher education, especially in those approaches that students need to solve the given problems or they are being taught specific skills in order for them to learn in a more practical and meaningful manner (Education, 2011).

Following Engelmann's theory of instruction, Slocum (2004), in National Institute of Direct Instruction, constructed a visual representation that explains and defines the factors and sequencing of a good lecture. The Direct Instruction is an approach that emphasizes the efficient acquisition, basic skills and subject matter through lectures and demonstrations, extensive practice, and corrective feedback. The steps in Direct Instruction are presented in Figure 1.1. It begins with the *Introduction/Review* which sets the stage for learning, followed by the *Idea Development* phase, which consists of the delivery of new materials, along with the clarification of learning outcomes by the students. The next phase is *Guided Practice* which allows students to engage in the application of the contents under the supervision of the teacher. Successful completion of the application phase allows the

teacher to establish *Closure* or conclusion to the section presented and the students would now be ready for *Independent Practice* which comprises activities and tasks related to the outcomes of the lesson and are captured in the model of Direct Instruction, classroom assignments, etc. *Evaluation* is the final stage where the students' mastery or progress is assessed which can be in the form of mid-term or final examinations.

Figure 1.1: Direct Instruction Model Offered by National Institute of Direct Instruction, available at: https://www.nifdi.org

Direct Instruction delivery can create a clear and explicit communication, in order to exploit students' answers (Kinder & Carnine, 1991). Besides, an inherent belief underlying the Direct Instruction is that knowledge is cumulative. The Direct Instruction cycle is repeated through numerous iterations in the belief that students will comprehend each component of the lessons separately through the ability to generalize, and also through the activities that employ their previously acquired knowledge and skills, which ultimately results in occurrence of a deep understanding

that incorporates the separate pieces of information into cogent wholes. Landa (1983) calls this iterative cumulative effect as the Snowball Effect. The Direct Instruction cycle would begin with the teaching of basic skills which is mastered thoroughly through each stage and this is followed by the next set of skills which is practised with the first, and so on. With a proper distribution of items for *Guided Practice* and *Independent Practice* across a series of lecture, students will acquire a comprehensive and exhaustive understanding of a given topic.

While the elements of Direct Instruction are designed to increase the students' interaction and engagement in the classroom, there are also other factors that promote interaction and involvement to the point that in their absence, their engagement are dramatically reduced. These factors are demonstrating expertise and strong beliefs in the knowledge or subject being presented, presenting clear and logically sequenced content, making the materials accessible, legible and meaningful, having good coverage and relevance of the subject matter, being supportive and accommodative in receiving inputs and criticisms, being concise and eager, as well as appearing to be caring and spontaneous (Milojkovic, 1982). Also, the pace and volume of speech, level of energy, body language, rapport with the audience, posture, and gestures are other speech and presentation factors that continuously keep audiences engaged during the delivery and presentation.

On the one hand, university lectures are given a new status of worldwide access and recognition through the open source movement that promoted the publication of academic contents for free public access for non-commercial use (Goldberg & LaMagna, 2012). These lectures are recorded in actual classrooms and offered online under the category of open educational resources by participating universities. They comprise full sets of lectures for selected courses that can be viewed for enrichment

purposes or acquiring credits. With regards to the extensive usage of the recorded video lecture in the education, there is a need for investigating the methods of delivery of these videos, which is the focus of the present study.

1.2 Background of the Study

Given to the wide range of the usage of the video lectures in the universities, the flexible nature of recorded video lectures has provided the viewers with viewing and reviewing the lectures in their own time and location. Besides, they have been able to make up for any missed classes through watching these recorded video lectures. Therefore, viewers will be able to fit the lecture delivery to their own learning pace, while avoiding a distractive environment (Murphy & Stewart, 2015).

At the same time with the emergence of generating video lecturing in higher education, the matter of supporting, enhancing, and replacing the traditional face to face lectures was also a concern by the researchers in this field. Accordingly, two comprehensive types of recorded video lectures' use was identified: *Substational use*, which refers to the aspect of review and revision of the recorded lectures, *Supplementary use*, which is inferred from the aspect of providing additional facts, such as a guideline or summary, in order for students to extend and dig out their understanding (McGarr, 2009).

Furthermore, the reason for the proliferation of media and particularly video usage, refers to these facts that the processes of their design, spreading, and consumption has been more rapidly and less costly rather than before. Consequently, people either in their personal or professional life, expect the media to be more accessible and offered (Kaufman & Mohan, 2009).

Likewise, video lectures are being offered in many well-known universities (e.g., Stanford, Oxford, MIT, EPFL and Harvard) in most subjects, and in a variety of ways, such as live video lectures, capturing, and on-demand, etc. (Giannakos, Jaccheri, & Krogstie, 2016).

Present-day Malaysia augmented the accessibility of an enormous number of its people to higher education in order to construct a knowledge community. There is a large number of governmental and private universities due to a high demand for education and also the aim to create a knowledge community. Malaysia is not an exception, and has started recording and presenting video lectures in its institution of higher education, such as Wawasan Open University (WOU), Open University Malaysia (OUM), Universiti Teknologi Malaysia (UTM), and International Medical University (IMU). Furthermore, they have been provided a robust encouragement and support by those who support the use of recorded video lectures in Malaysia (Yamada et al., 2014; Dhanarajan & Porter, 2013). With regards to the absence of licensing and policy and moreover with the intention of making instructors to share and promote their content freely, the Ministry of Higher Education of Malaysia (MOHE) presented a national policy in 2013 in order to make the country a leader in this field in the future (Mohamed, 2013).

In an effort to transform teaching and learning, Universiti Sains Malaysia has embarked on providing recorded video lectures on the web. Accordingly, the Centre for Development of Academic Excellence (CDAE), or Pusat Pembangunan Kecemerlangan Akademik, was formed by the Universiti Sains Malaysia (USM) on the 1st of January 2012. Its aim was to improve teaching quality among educators (i.e., academics) while planning and executing activities in accordance to the National

Higher Education Strategic Plan and National e-Learning Policy initiated by the Ministry of Higher Education (MOHE).

Through the establishment of the CDAE, Universiti Sains Malaysia has taken another step towards advancing the higher education environment within the university and also towards the ultimate aim of the Ministry of Higher Education, which is to turn the country into a centre of excellence for higher education. In order to fulfill this goal, Open Course Ware (OCW) was planned and created by CDAE in USM. Courses and lectures were available at ocw.usm.my website.

At the same time, CDAE started to record video lectures for some specific courses - with the cooperation of the lecturers of those courses - in order to present them in the university's learning management system portal. eLearn@USM.my is the official e-learning portal for USM lecturers and students, which is deployed using Moodle (Current Version: 3.1) as their Learning Management System. This is a centralized learning centre for USM lecturers and students and all courses offered by the university can be found in this portal. eLearn@USM.my enables smooth course administration, delivery and management between lecturers, student and course administrator.

Thus, considering the using of the video lectures in some of the USM courses, the focus of the current study is to investigate these videos in terms of their effectiveness on the students' engagement and also on their understanding and learning, by investigating the Direct Instruction elements in the presented videos.

1.3 Statement of the Problem

Currently, the advent of recording and offering the video lectures, as one of the key constituents of multimedia, has been emphasized and increasingly used in higher education, either in teaching, or in the learning processes (Tuanku & Bahiyah, 2017).

Video lectures, such as open educational resources and any recorded lectures that are presented in different platforms, such as eLearn@USM.my and other platforms, consist of lectures by content experts of some universities that are shared to benefit any interested users. The measure of the Quality of Delivery of video lectures can be captured by the Direct Instruction model of teaching, where the instructor acts as a content expert who directly engages the learners and at the same time manages their learning. The recordings are also performed as non-invasively as possible to retain and capture the natural flow and conduct of the lectures. The lecturers are evaluated by their students at the end of the semester, but there is no evaluation as to whether their lectures have followed the Direct Instruction format.

The video lectures are also expected to be viewed individually, and the users attend to the content from beginning to the end like a normal lecture. Students would be working on their class assignments or other activities and have the video lectures playing simultaneously as additional fillers. Other differences are in the form of conscious, active and reflective activities, for example, that attending a normal lecture or a recorded lecture involves different levels of engagement such as paying attention, taking notes physically and mentally, making mental rehearsals to fit and apply the new knowledge, as well as summarizing the outcomes into the existing knowledge structure or schema.

In the video lectures, the knowledge acquisition stage involves S*canning*, *Problem Solving*, and *Abstraction* (Boisot, 1998). Boisot further says that learning

does not end with knowledge acquisition, but the student must engage in another stage of *Diffusion* or knowledge sharing activities for the new knowledge to be more deeply understood. Using video lectures involves the option of *Diffusion* and sharing through forums, blogs, or social media. So, it is natural to expect that the Quality of Delivery of the lectures and the content of the lectures would be elements which are discussed and evaluated in the sharing activities among the students. The continuous or intensive sharing activities with other students not only deepen understanding, but also transform the sharer by improving his or her levels of confidence, expertise, identity, and other personality traits (Landa, 1983).

It seems that there is a lack of studies for investigating the Quality of Delivery of locally developed recorded video lectures, and whether they produce effects similar to classroom learning, for example in acquiring the cumulative effects of snowballing of knowledge. Also there is a need to investigate whether the video lectures trigger active learning engagement which is necessary for learning to occur, and whether the drivers of engagement are factors of the Quality of Delivery.

From this time, whatever is already known about video lectures is that there is a wide variety of ways of using video lectures among viewers, and also video lectures have been implemented and presented in a variety of ways, through higher education institutions and training organizations. Then, ultimately based on the literature, this is the viewers' usage pattern that will specify their intention to select some platform to use (Giannakos et al., 2016). However, this study specifically incorporates responses from students who viewed the USM-developed video lectures in duration of one set in one semester, with the purpose of measuring the viewers' engagement, together with investigating the relationship between the Quality of Delivery of the USM-developed video lectures and the viewers' engagement with cumulative effect of snowballing

knowledge. Moreover, regardless of pervasive producing and sharing of video lectures by educational institutions, there is a lack of a standard and guideline to create a video lecture, which consequently has resulted in poor investigation in video lectures' effectiveness, in terms of learning and usability (Wang, Chen, & Wu, 2016).

Scagnoli, Choo and Tian (2017) stated that there are some researches on the video lectures that are investigating the video lectures in terms of the students' satisfaction and their achievement, but their results are not consistent.

Moreover, there is a lack of studies that investigate the influence of the specific elements of the video lectures on the students' engagement and also on their snowball effect. For instance, can the practice element in the video lecture impact the students' engagement and their understanding?

Furthermore, Dommeyer (2017) stated that the results of the studies about the effects of the video lectures on the students' achievement are mixed. In his meta/analysis study of the seventeen studies that examine how video lecture affected students achievement, eight studies found with no effect, four studies negative effect, and five with mixed effect. Hence, it warrants in more investigation how video lectures influence students achievement. Therefore there is a further need for the investigating of the specific elements of delivery of the video lectures on the students' engagement and learning. Hence, this study attempt to fill the gap of the research regarding the influence of the elements of delivery of the video lectures on the students' engagement and learning.

Therefore, this study aims to investigate the quality of delivery of the USM-developed video lectures, for the intention of realizing potential usability, through investigating the quality of delivery, which is understood that it can lead to users'

higher engagement, and eventually cumulative snowball effects of knowledge for them.

1.4 Objectives of the Study

The specific objectives of this study are:

1. To analyse the Direct Instruction elements of the USM-developed video lectures.
2. To investigate the students' perceptions of the Direct Instruction Elements of the USM-developed video lectures.
3. To investigate the effects of the Direct Instruction elements on the students' Snowball Effect, namely *Independent Practice* and *Assess performance*.
4. To investigate the students' perception of their Engagement in the use of the USM-developed video lectures.
5. To investigate the effects of the Direct Instruction elements on the students' Engagement in the use of the USM-developed video lectures.

1.5 Research Questions

The research questions of this study are:

1. What are the dominant elements of the Direct Instruction of the USM-developed video lectures?
2. What are the students' perceptions of the Direct Instruction elements of the USM-developed video lectures?
3. Do the Direct Instruction elements of the USM-developed video lectures, namely, *Introduction*, *Idea Development*, *Guided Practice*, and *Closure* promote the Snowball Effect (*Independent Practice* and *Assess Performance*)?

4. What are the students' perceptions of the Direct Instruction elements of the USM-developed video lectures on their Engagement?
5. Do the Direct Instruction elements of the USM-developed video lectures (*Introduction*, *Idea Development*, *Guided Practice*, and *Closure*) have significant positive effects on the elements of the Engagement (*Scanning*, *Problem Solving*, *Abstraction*, *Diffusion*, *Absorption*, and *Impacting)*?

1.6 Theoretical Framework

Direct Instruction is an instructional model which emphasizes on the interaction between instructor and student, with the key characters of reinforcement, Modelling, Feedback, and successive estimation" (Joyce, Weil, & Calhoun, 2000, p. 337). Joyce and colleagues enumerated the principles of the instructional design such as framing students' performance into goals and tasks, breaking tasks to the smaller component, providing training activities for mastery, considering the prerequisite learning before moving to more advance learning.

Furthermore, Bandura (1977) has proposed the Social Cognitive Learning Theory, with the premise that learning occurs by observing others, acquiring knowledge of rules, skills, strategies, beliefs, and attitudes. Likewise, individuals learn by acting in accordance with the modelled behaviours and actions, with their views concerning the expected consequences. Therefore, Social Cognitive Learning Theory of Bandura can be considered as the basis of the Direct Instruction, which is defined as "modelling with reinforced guided performance" by Joyce et al., (2000).

Following Cleveland (1982), Boisot (1998) proposed the Social Learning Cycle model which is the dynamic flow of experience the learner undergoes as he/she develops meaning and understanding through a series of phases from data to internalized

knowledge. The processes of the Social Learning Cycle are: *Scanning*, where the learner gains insights from the set of data; *Problem Solving*, where the insights are tested and verified; *Abstraction*, where the verified or acquired knowledge is applied in various situations and generalized; *Diffusion*, where the generalized knowledge is shared and applied to a much wider context; *Absorption*, where the knowledge becomes tacit or internalized; and *Impacting*, where the knowledge becomes a personality complex. In other words, the Boisot's model can be depicted in three dimensions of 'uncodified to codified", "concrete to abstract", and "undiffused to diffused", in which, a stream of knowledge will take place in the dynamic phases, including *Scanning*, Problem-Solving, *Abstraction*, *Diffusion*, and *Absorption*. In the *Scanning* phase, insights are gained from generally available (diffused) data. In the Problem-Solving stage, problems are solved giving structure and coherence to these insights, and knowledge becomes 'codified'. *Abstraction* is a phase in which the newly codified insights are generalized to a wide range of situations, and knowledge becomes more 'abstract'. During the *Diffusion* phase, the new insights are shared with a target population in a codified and abstract form, and knowledge becomes 'diffused'. In the *Absorption* phase, the newly codified insights are applied to a variety of situations producing new learning experiences. In other words, in this phase, knowledge is absorbed and produces learnt behaviour and so becomes 'uncodified', or 'tacit', and

finally what will happen in the *Impacting* phase is that abstract knowledge becomes embedded in concrete practices, for example in artefacts, rules or behaviour patterns, and knowledge becomes 'concrete'. (Boisot, 1999).

In a learning process, through a movement from the earliest stage to the higher level, firstly the learners start to gather diffused data, and via the Scanning they will obtain an insight from generally available data. In the next stage of the knowledge transformation, the data will be codified for them and will turn into the Information, by which they will be able to solve the given problems. At the stage of the Knowledge, their understanding will be more abstracted and the newly codified insights are generalized to a wider range of situation. In addition, the learners will be able to share their understanding and knowledge through the diffusion stage of their learning. Likewise the learner will start to apply their newly acquired knowledge, and also will be able to absorb their understanding. They also can produce learnt behaviour. In other words, in this phase, Absorption will occur for them and their knowledge becomes uncodified or tacit.

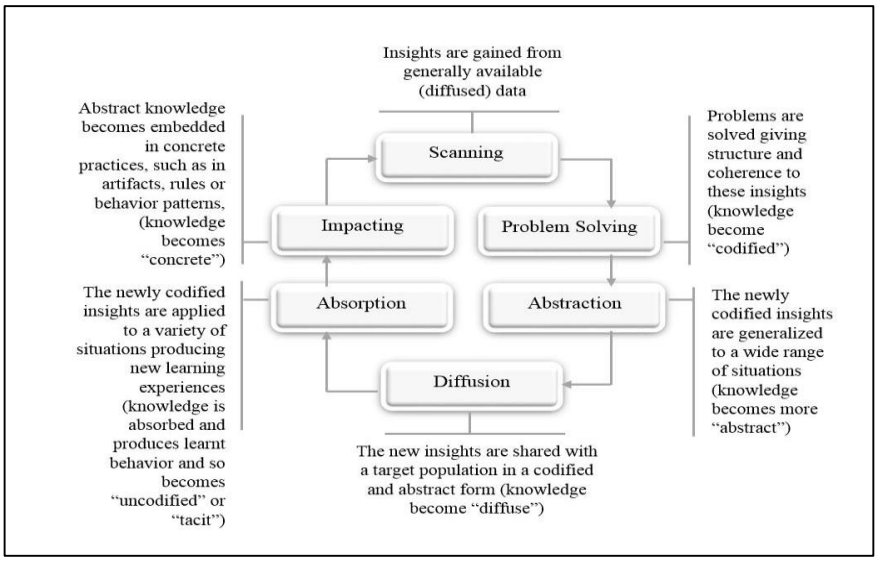

Figure 1.2: Boisot's (1998) Social Learning Cycle

In the last stage of the Knowledge Transformation Model which is Wisdom, Knowledge becomes concrete for them, and they will be able to bring it to the behaviour or practice.

Figure 1.3 demonstrates the relationship between the Cleveland's Model of Knowledge Transformation with the elements of the Social Learning Cycle Model of Boisot.

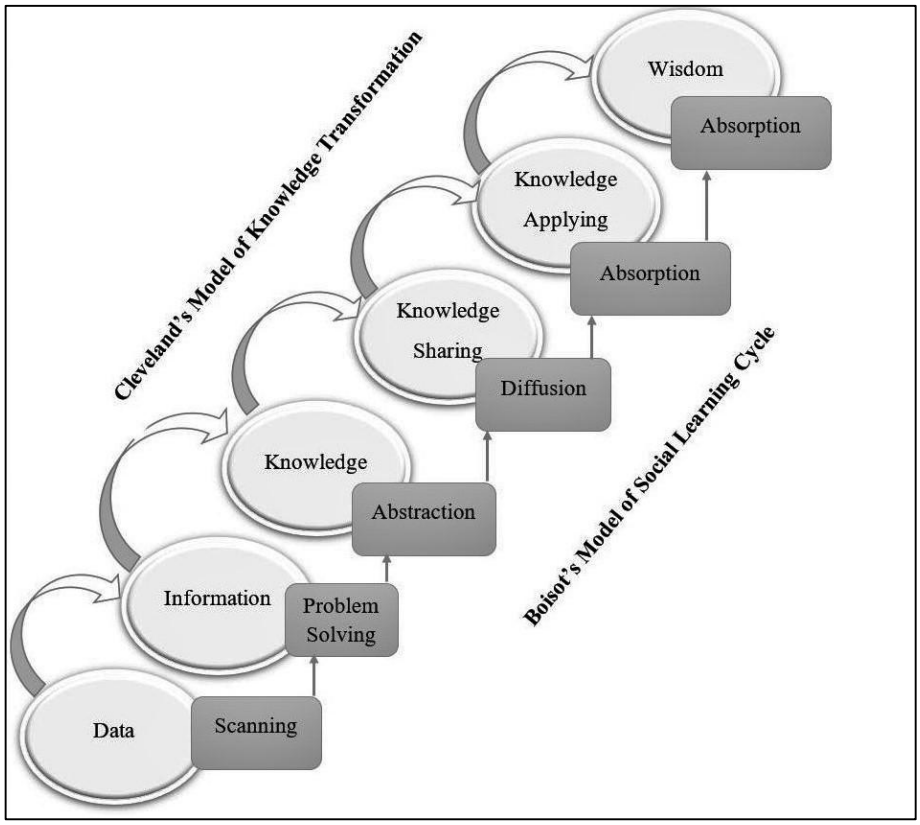

Figure 1.3: The Structural Relationship between the Cleveland's Model of Knowledge Transformation with the Boisot's Social Learning Cycle Model

Regarding the connection between the elements of the Direct Instruction model with the Cleveland's Model of Knowledge Transformation and Boisots' Model of Social Learning Cycle, it may be said that the way of delivery is effective for the learners to pass the stages through an organized and well-structured model of delivery. Furthermore, the Direct Instruction steps of delivery will provide the learners with an organized direction in order for them to take the route from the Data to the Wisdom,

and also to be engaged from the Scanning to the Impacting phase. Furthermore, according to the Landa's taxonomy of learning, learning will happen and later will be cumulated through the processes of Knowledge, Skills, and Abilities, following by a higher level, which is called Personality traits. However, Landa in his taxonomy elaborates the path of the learning in a more general classification that can be applied more practical by elaborating in the form of the elements of the theories of Cleveland and Boisot.

Table 1.1 demonstrates the structural relationships between the function of the Direct Instruction model of delivery with both the Cleveland's Knowledge Transformation Model and the Boisot's Social Learning Cycle model, under the foundation of the Landa's Taxonomy of Learning.

Table 1.1:
The structural relationships between the applied theories

Landa's Taxonomy of Learning	**Direct Instruction Elements / Functions**	**Cleveland's Knowledge Transformation Model**	**Boisot's Social Learning Cycle Model**	**The Terms of Structural Connection**
Knowledge	Introduction	(Preparation) Data	Scanning	Preliminary attempts and preparation for the learners, in order for them to gain insights from generally available data.
	Idea Development	Information and Knowledge Gaining	Problem Solving and Abstraction	Developing an organized and abstracted idea for the learner, so that they will be able to codify the data to the information.
Skills	Guided Practice	Knowledge Sharing Knowledge Improving	Diffusion	Providing the learners with the opportunity of practicing their newly learnt knowledge and also diffusing their knowledge, in order

				for them to improve their gained knowledge.
	Closure	Knowledge Refining	Absorption	Providing the learners with the summary of the main point of the lesson, in order for them to uncodify their knowledge.
Abilities	Independent Practice	Knowledge Applying	Absorption	Providing the learners with the opportunity of practicing independently with their uncodified knowledge, and also producing their own learnt behaviour, as a tacit knowledge.
Personality Traits	Assess Performance	Wisdom	Impacting	Provide the learners with the periodical assignments, in order to assess their understanding, to find out the degree of positive effects on their Wisdom and Impacting.

As can be seen in the above table, *Knowledge* from Landa's foundation can be achieved by the function of the *Introduction* and *Idea Development* of the Direct Instruction. These two elements of delivery of a lesson are functioning aligned with the *Preparation of data* and also the *Information and Knowledge Gaining* of Cleveland. Furthermore, the two first elements of the Direct Instruction enable students to engage in the *Scanning*, *Problem Solving*, and *Abstraction* of their cycle of learning. In the other words, through the two first elements of the Direct Instruction, learners are dealing with the preliminary attempts, in order for them to gain insights from generally available data.

Likewise, through the function of the *Guided Practice* and *Closure* elements of the Direct Instruction, learners will be able to transform through *Knowledge Sharing*, *Knowledge Improving*, and *Knowledge Refining* phases of Cleveland model, by means of the cycle of *Diffusion* and *Absorption* of their engagement in learning. This phase of learning, provide students with the summary of the main points of the lesson, in order for them to uncodified their knowledge, which is aligned with *Skill* acquisition from the taxonomy of Landa.

Furthermore, through the function of the *Independent Practice* element of the Direct Instruction, the learners will reach from *Skills* to *Abilities*. This effort can be defined as *Knowledge Applying*, in which the learners will start to practice independently with their uncodified knowledge. Also, they will be able to produce their own learnt behavior as a tacit knowledge, and reach to the *Absorption* cycle of their engagement in learning.

Lastly, through the function of the last element of the Direct Instruction, namely *Assess Performance*, the learners transform from *Knowledge* to *Wisdom*, which is the highest level of the knowledge transformation model of Cleveland. In this phase of learning, the learners' *Abilities* will turn into the *Personality Traits* that can be identified by *Impacting* of their learning cycle. In this level of learning, *Assess Performance* will provide the learners with the periodical assignments, in order to assess their understanding, to find out the degree of positive effects on their engagement in terms of *Wisdom* and *Impacting*.

Hence, it is worth nothing that the Direct Instruction elements have the capability of keep learners engaged in their cycle of learning, and consequently transform their knowledge to wisdom. In addition, the function of the elements of the Direct Instruction model of delivery is able to transform the learners' level of

understanding from the lowest level of data and information into the abilities and personality traits.

1.7 Research Framework

The Direct Instruction elements offer the varied learning experiences with bringing the lesson to a conclusion before the students are allowed to work independently in applying the new knowledge. These elements engage or impact the viewers at cognitive levels that can be measured by factors suggested by Boisot et al. (1998). The following research framework is proposed for the study to investigate the relationship between the Quality of Delivery of the USM-developed video lectures with the students' engagement, as well as Snowball Effect among them.

In this framework, independent variables are the four first elements of the Direct Instruction model, namely, *Introduction*, *Idea Development*, *Guided Practice*, and *Closure*, which are defined as the Quality of Delivery. Dependent variables of this framework incorporate the elements of the Social Learning Cycle model of Boisot, and defined as the students' Engagement. Another group of the dependent variable is defined as Snowball Effect, and it encompasses the two last elements of the Direct Instruction model, namely, *Independent Practice*, and *Assess Performance*.

Figure 1.4 demonstrates the set of independent variables under the category of the Quality of Delivery, and the dependent variables under the categories of the students' Engagement and the Snowball Effect.

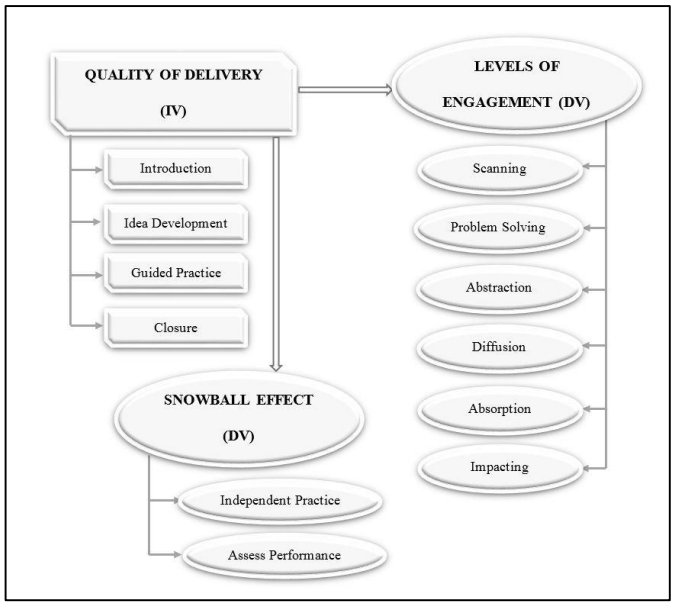

Figure 1.4: The Research Framework of the Study

Based on the aforementioned framework, the current study is trying to analyse the effectiveness of each element of the Quality of Delivery, which is retrieved from the Direct Instruction model elements on the Students' Engagement elements. Students' Engagement is their activities in their learning processes which is retrieved from the Boisot's Social Learning Cycle Model. Likewise, the elements of the Quality of Delivery will be evaluated in terms of their effectiveness on the students' Snowball Effect.

1.8 Significance of the Study

Video lectures are the reuse, recycling, or repurposing of learning or knowledge sharing events to interested or needy parties all over the world. The proof of the effectiveness of the video lectures, despite the disconnection in time and context, would encourage their contributions. Moreover, a good understanding of the mechanism of learning from the recordings, would improve the design and production of future video lectures.

There is now widespread recognition of the changing nature of students in higher education: they are demographically diverse, have extensive external time demands, and expect greater flexibility and support during their study programs. As a consequence of this and other changes to the higher education sector, many universities worldwide have introduced a range of information and communication technologies to provide students with flexible options for study. Included in these options are web-based lecture technologies, designed to digitally record lectures for delivery over the web (Preston et al., 2010).

The potential results of the current study, will provide the future studies with conducting more comprehensive and holistic research in this field. Moreover, the results perhaps will be able to highlight the weakness and the strength of delivery of the video lectures, which can be helpful in identifying and removing the existing obstacles. Moreover, considering all the agents involved in developing the video lectures will provide video designers with a holistic view to develop high quality videos in the future, with regards to the pedagogical, technological, and also social aspects. Furthermore, these studies will help the instructors to eliminate existing deficiencies and pave the way for developing more effective video lectures in future.

1.9 Limitations of the Study

According to De Leeuw, Hox, and Dillman (2008), every research has some limitations in different aspects. This study is not exceptional, and has a number of limitations itself. Limitations of the current study are as follows:

This study has been bound to the investigation of the Quality of Delivery of USM-developed video lectures, as well as the users' perception of the Quality of Delivery, and also their engagement into that video lectures. Therefore, the findings possibly cannot be generalized to the other universities or colleges.

Moreover, not all courses in Universiti Sains Malaysia presented video lectures for their courses. So the researcher is limited to conduct this study only on the specific courses, and even among these specific courses, only for those courses in which lecturers agreed to be investigated by the researcher. Thus, it seems that the limitation of the number of the courses with video lectures is another limitation of this study that prevents the researcher to be able to generalize the results into all subjects and majors.

Another limitation of the current study may raise from the teachers' experiences of teaching, therefore, the researcher was not able to group the video lectures based on the teaching experience of their presenters while investigation.

Similarly, only a limited number of undergraduate students from the only groups were surveyed and interviewed. Others who were involved in that environment, such as lesson designers, instructors, and administrators, were not been taken into account. Therefore, the results grounded merely on a limited group of students' perceptions toward the video lectures. Consequently, the results of the current study cannot be applied to other groups of students, such as Masters' or PhD students, because as adult learners, they usually learn and engage differently.

1.10 Operational Definition

1.10.1 Quality of Delivery

As noted by Archer and Hughes (2011), Direct Instruction is characterized by three essential stages: (a) clear *delivery* with models and demonstrations, followed by (b) *guided practice* supported by the teacher with corrective feedback delivered in a timely manner, and finally (c) gradual withdrawal of teacher supports during practice to move students toward *independent performance*. Thus, these three essential stages define the quality of a lesson delivered by the instructor. In other words, in the current

study, the Quality of Delivery is measured by the elements of the Direct Instruction model.

The data for perceived Quality of Delivery will be collected by the *Quality of Delivery* questionnaire. This questionnaire consists of a set of scores obtained through the survey, covering the Direct Instruction model elements: *Introduction and Review*, *Idea Development*, *Guided Practice*, *Closure*, *Independent Practice*, and *Assess Performance*. These elements are explained in the following section:

- *Introduction* and Review: Starting with a form of introductory focus which can include reviewing previous work, as well as stating the objectives and criteria of expected performance.
- *Idea Development*: Giving a clear, detailed, and well-structured presentation of the main point of new material, so-called input, in addition to giving insight of new material, through an organized and coherent theme of materials, in consort with using modelling such as asking questions, and bringing examples.
- *Guided Practice*: Asking students to work in small groups organized by their abilities and giving immediate feedback for every task completed.
- *Closure*: The process of applying and summarizing the knowledge into the specific topics and contexts through presenting a summary of the important contents of each unit.
- *Independent Practice*: The process of applying and generalizing the knowledge into a wide range of situations, by providing examples and exercises.
- *Assess Performance*: The process of evaluating the students' understanding through gauging their ability to recite and recall the information that they have learned.

1.10.2 Students' Engagement

As Withers (2016) noted, researchers (for example. Karplus & Thier, 1967; Thier *et al*., 1970; BSCS, 1995; Bybee *et al*., 2006) claimed that learning cycles have been used to design instruction and improve student learning for decades, and the stages of learning cycles provide a structure and order to cognitively engage students in activities. Similarly, the Macquarie University Learning and Teaching Centre (2009) defined engagement as the degree or superiority with which learners are actively involved in their learning.

The students' Engagement is defined from a set of scores obtained through the survey that cover the Social Learning Cycle model elements, namely, *Scanning*, *Problem Solving*, *Abstraction*, *Diffusion*, *Absorption*, and *Impacting*, which are defined as following:

- *Scanning* in which the learner gains insights from the set of data.
- *Problem Solving* in which the insights are tested and verified.
- *Abstraction* in which the verified or acquired knowledge is applied in various situations and generalized.
- *Diffusion* in which the generalized knowledge is shared and applied to much wider context.
- *Absorption* in which the knowledge becomes tacit or internalized.
- *Impacting* in which the knowledge becomes a personality complex.

The data for students' engagement was collected by the *Students' Engagement* questionnaire.